



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,143	11/09/2000	Udo Bub	P00,1797	1920
29177	7590	01/19/2005	EXAMINER	
BELL, BOYD & LLOYD, LLC				VO, HUYEN X
P. O. BOX 1135				ART UNIT
CHICAGO, IL 60690-1135				PAPER NUMBER
				2655

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/700,143	BUB ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Huyen Vo	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 03 January 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,3-5,7 and 9-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,3-5,7 and 9-11 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 03 January 2005 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## DETAILED ACTION

### ***Response to Arguments***

1. Applicant's arguments, see pages 6-7, filed 1/3/2005, with respect to the rejection(s) of claim(s) 1 and 7 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Alleva et al. (US 5794197).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 4-5, 7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takami et al. (IEEE ICASSP'92) in view of Alleva et al. (US 5794197).

4. Regarding claims 1 and 7, Takami et al. disclose the use of a speech recognition system (*also executed on a processor or computer*) that

- Digitalizes a voice signal (Col 6, pg 575).
- Extracts features (Col. 6, pg 575).

c. Uses imaging of features in an acoustical model that utilizes HMM as a basis to model speech (Col. 6, pg 575).

d. A global search that produces a recognized word sequence (Col. 6, pg 575).

Takami et al. fail to disclose the step of adapting the probability density function by modifying the vocabulary by splitting the probability density function into a first and second probability density functions if a drop of an entropy value is below a predetermined threshold, wherein the adaptation is dynamically performed at run time. However, Alleva et al. teach the step of adapting the probability density function by modifying the vocabulary by splitting the probability density function into a first and second probability density functions if a drop of an entropy value is below a predetermined threshold, wherein the adaptation is dynamically performed at run time (*referring to figure 2, particularly elements 54-58 and/or referring to col. 6, lines 49-67*).

Since Takami et al. and Alleva et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Takami et al. by incorporating the teaching of Alleva et al. in order to improve speech recognition accuracy.

5. Regarding claim 4, the modified Takami et al. show the use of a z-mixture gaussian probability function (Col. 1, pg 574).

6. Regarding claim 5, the modified Takami et al. show splitting of states of a probability functions by the use of entropy. The concept of splitting the probability

density functions or modes by the approximation, where for a large number of random samples, the standard deviations are equal and the means are different is logical. The standard deviation of the probability density functions is not expected to change significantly since the scatter conditions is not expected to change significantly between modes. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made not to equate the mean since it is the only way to distinguish new modes.

7. Regarding claim 9, the main purpose of the modified Takami et al. algorithm is the determination of the model architecture and parameters simultaneously. This algorithm will improve on the speed and efficiency of a speech recognition system and give a faster execution time.

8. Regarding claim 11, the modified Takami et al. disclose a successive state splitting algorithm (pg 574, Col1).

9. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takami et al. (IEEE ICASSP'92), in view of Alleva et al. (US 5794197), as applied to claim 1 or 7 above, and further in view of Phillip et al (U.S. Patent 6501833).

10. Regarding claim 3, the modified Takami et al. show the use of splitting of the probability density functions by the use of entropy as a means of training/updating

codebooks. The modified Takami et al. do not show the modification of a large vocabulary by the dynamic addition of new words. However, Phillips et al. teach "The speech recognition system for dynamically adding words to an active portion of a total vocabulary ... ", (Col 14, lines 5- 45). The adaptive or dynamic capability of a speech recognition system gives the advantages of the rapid and efficient addition of new words to a system's active vocabulary.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify the modified Takami et al. with the dynamic addition of new words to create a large vocabulary as taught by Phillips in order to develop an online speech recognition application.

11. Regarding claim 10, the modified Takami et al. show the use of splitting of the probability density functions by the use of entropy as a means of training/updating codebooks. The modified Takami et al. do not teach a method of adapting to a speaker pronunciation. However, Phillips et al. teach "A method for producing a word pronunciation network ... a pre-established active vocabulary... word is selected from a base form pronunciation..." (Col4, line 54 - Col15, line 65). The adaptive or dynamic capability of a speech recognition system gives the advantages of the rapid and efficient addition of new speaker pronunciations to a system's active vocabulary.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify the modified Takami et al. by the splitting of the

probability density functions for 'online' adaptation as taught by Phillips et al. in order to develop a dynamic speech recognition system.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen Vo whose telephone number is 703-305-8665. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703-305-4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Huyen X. Vo

January 14, 2005

\*\*\*



SUSAN MCFADDEN  
PRIMARY EXAMINER